

What is claimed is:

1. A method of controlling a system having at least one motorized pump and an associated motor drive, comprising:

selecting a desired operating point within an allowable range of operation about a system setpoint according to performance characteristics associated with a plurality of components in the system; and

controlling the system according to the desired operating point.

2. The method of claim 1, wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the performance characteristics associated with a plurality of components in the system comprises efficiencies of at least two of the motor, the pump, and the motor drive.

3. The method of claim 2, further comprising obtaining the system setpoint and the allowable range of operation from a user.

4. The method of claim 2, wherein selecting the desired operating point comprises:

correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated system efficiency information; and

selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated system efficiency information.

5. The method of claim 4, wherein controlling the system according to the desired operating point comprises providing a motor speed signal to the motor drive according to the desired operating point.

6. The method of claim 4, further comprising obtaining at least one of the efficiency information, the allowable range, and the system setpoint from a user.

7. The method of claim 4, further comprising obtaining at least one of the efficiency information, the allowable range, and the system setpoint from a host computer.

8. The method of claim 7, wherein the at least one of the efficiency information, the allowable range, and the system setpoint is obtained via a network.

9. The method of claim 8, wherein the at least one of the efficiency information, the allowable range, and the system setpoint is obtained via wireless communications.

10. The method of claim 4, further comprising obtaining at least a portion of one of the efficiency information, the allowable range, and the system setpoint from prior operation of the system.

11. The method of claim 1, wherein selecting the desired operating point comprises:

correlating component performance information associated with at least two components in the system in order to derive correlated system performance information; and

selecting the desired operating point as the optimum performance point within the allowable range of operation according to the correlated system performance information.

12. The method of claim 11, wherein controlling the system according to the desired operating point comprises providing a setpoint to a controller associated with the system according to the desired operating point.

13. The method of claim 11, further comprising obtaining at least one of the performance information, the allowable range, and the system setpoint from a user.

14. The method of claim 11, further comprising obtaining at least one of the performance information, the allowable range, and the system setpoint from a host computer.

15. The method of claim 14, wherein the at least one of the performance information, the allowable range, and the system setpoint is obtained via a network.

16. The method of claim 15, wherein the at least one of the performance information, the allowable range, and the system setpoint is obtained via wireless communications.

17. The method of claim 11, further comprising obtaining at least a portion of one of the performance information, the allowable range, and the system setpoint from prior operation of the system.

18. The method of claim 11, wherein the component performance information comprises at least one of life cycle cost information, efficiency information, life expectancy information, safety information, emissions information, operational cost information, MTBF information, noise information, and vibration information.

19. The method of claim 18, wherein the system comprises a motorized pump system for pumping fluid, having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, wherein the component performance information comprises efficiency information related to at least two of the motor, the pump, and the motor drive, and wherein the correlated system performance information comprises cost information related to the system operational cost per unit of fluid pumped.

20. The method of claim 1, wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the performance characteristics

associated with a plurality of components in the system comprises life expectancies of at least two of the motor, the pump, and the motor drive.

21. The method of claim 1, wherein the system comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the performance characteristics associated with a plurality of components in the system comprises cost of operation associated with at least two of the motor, the pump, and the motor drive.

22. The method of claim 1, wherein selecting the desired operating point comprises measuring at least one process variable from a sensor associated with the system.

23. A control system for controlling a process having a pump with an associated motor, the control system comprising:

a motor drive providing electrical power to the motor in a controlled fashion according to a control signal; and

a controller providing the control signal to the motor drive according to a desired operating point within an allowable range of operation about a process setpoint;

wherein the controller selects the desired operating point according to performance characteristics associated with a plurality of components in the process.

24. The control system of claim 23, wherein the performance characteristics associated with a plurality of components in the process comprises efficiencies of at least two of the motor, the pump, and the motor drive.

25. The control system of claim 23, wherein the controller is adapted to correlate at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated process efficiency information, and to select the desired operating point as the optimum efficiency point

within the allowable range of operation according to the correlated process efficiency information.

26. The control system of claim 25, wherein the controller provides the control signal as a motor speed signal to the motor drive according to the desired operating point.

27. The control system of claim 25, further comprising a user interface, wherein the controller obtains at least one of the efficiency information, the allowable range, and the process setpoint from a user via the user interface.

28. The control system of claim 25, wherein the controller comprises a network interface operatively connecting the controller with a host computer through a network, and wherein the controller obtains at least one of the efficiency information, the allowable range, and the process setpoint from the host computer via the network.

29. The control system of claim 25, wherein the controller comprises a wireless communication device, and wherein the controller obtains the at least one of the efficiency information, the allowable range, and the process setpoint via wireless communications using the wireless communications device.

30. The control system of claim 25, wherein the controller obtains at least a portion of one of the efficiency information, the allowable range, and the process setpoint from prior operation of the process.

31. The control system of claim 23, wherein the controller is adapted to correlate component performance information associated with at least two components in the process in order to derive correlated process performance information, and to select the desired operating point as the optimum performance point within the allowable range of operation according to the correlated process performance information.

32. The control system of claim 31, wherein the controller provides the control signal as a motor speed signal to the motor drive according to the desired operating point.

33. The control system of claim 31, wherein the component performance information comprises at least one of life cycle cost information, efficiency information, life expectancy information, safety information, emissions information, operational cost information, MTBF information, noise information, and vibration information.

34. A control system for controlling a process having a pump with an associated motor, the control system comprising:

a motor drive adapted to provide electrical power to the motor in a controlled fashion according to a control signal; and

means for providing the control signal to the motor drive according to a desired operating point within an allowable range of operation about a process setpoint; and

means for selecting the desired operating point according to performance characteristics associated with a plurality of components in the process.

35. A control system for controlling a process having at least one motorized pump and an associated motor drive, comprising:

means for selecting a desired operating point within an allowable range of operation about a process setpoint according to performance characteristics associated with a plurality of components in the process; and

means for controlling the process according to the desired operating point.

36. The control system of claim 35, wherein the process comprises a motorized pump system having an electric motor operatively coupled with a pump, and a motor drive providing electrical power to the motor, and wherein the means for selecting a desired operating point comprises:

means for correlating at least two of motor efficiency information, pump efficiency information, and motor drive efficiency information in order to derive correlated process efficiency information; and

means for selecting the desired operating point as the optimum efficiency point within the allowable range of operation according to the correlated process efficiency information.

37. A pump control system for operating a pump driven by a motor in a controlled fashion, comprising:

a motor drive providing electric power to operate the motor in a controlled fashion according to a motor control signal; and

a controller comprising a diagnostic component operatively connected to diagnose an operating condition associated with the pump;

wherein the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal from the diagnostic component according to the diagnosed operating condition in the pump.

38. The pump control system of claim 37, wherein the diagnostic component performs signature analysis of at least one sensor signal from a sensor associated with the pump in order to diagnose the operating condition associated with the pump.

39. The control system of claim 38, wherein the at least one sensor signal is related to one of flow, pressure, current, noise, vibration, and temperature associated with the pump.

40. A controller for providing a control signal to a motor drive to operate a motorized pump in a controlled fashion, comprising:

a diagnostic component operatively connected to the pump to diagnose an operating condition associated with the pump;

wherein the controller provides the control signal to the motor drive according to a setpoint and a diagnostic signal from the diagnostic component according to the diagnosed operating condition in the pump.

41. The controller of claim 40, wherein the diagnostic component performs signature analysis of at least one sensor signal from a sensor associated with the pump in order to diagnose the operating condition associated with the pump.

42. The controller of claim 41, wherein the at least one sensor signal is related to one of flow, pressure, current, noise, vibration, and temperature associated with the pump.

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